REMARKS

Claim 12 and dependent claims 13-21 and 26 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Particularly, the Examiner objects to the phrase "more likely to be similar" as a relative term, stating that the specification does not provide a standard for ascertaining the relative degree and that one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

As applied to claim 12 as amended, Applicants respectfully traverse the rejection, as the objected-to claim phrase is clear precisely because it is relative. A particular relative degree of similarity regarding program behavior does not need to be defined to make the claim clear. As defined, each of the intervals is more likely to be similar in program behavior to intervals within its particular cluster than to intervals in other clusters. The claimed program behavior is defined in independent claim 1 as being identified based on a tracked statistic. An example of this clustering is provided in the present specification, e.g., see page 44 – page 46. The amount of similarity between intervals within and among clusters is not defined, because it may depend, for example, on the number of clusters selected. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection.

Claims 41, 42, and 47 (with dependent claims 48-53) also stand rejected under 35 U.S.C. § 112, second paragraph. Applicants have amended claims 41, 42, and 47 to

address each of the Examiner's objections, and submit that the claims as amended overcome the rejection. Applicants thus request reconsideration and withdrawal of the rejection.

Claims 1-43 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. The Examiner states that the claim limitations fail to produce a result that is useful, concrete, and tangible. Applicants respectfully traverse the rejection. A claimed invention must be useful and accomplish a practical application; i.e., it must produce a "useful, concrete, and tangible result." State Street Bank & Trust Co. v. Signature Financial Group, 149 F.3d 1368, 1373-74 (Fed.Cir. 1998). Independent claims 1, 27, and 35 meet this test as well as other criteria for patentability set out, for example, in the Patent Office's own Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility (Interim Guidelines).

Claim 1, for example, defines a method of analyzing a computer program comprising running code of a computer program, tracking a statistic for a program component, identifying a behavior, and determining a similarity between intervals of execution. Claim 27 defines a method of analyzing a computer program comprising running at least a portion of the computer program, identifying behavior of a hardware-independnet metric within at least one arbitrary section of execution of the portion of the computer program, and classifying each of the arbitrary sections of execution according to the identified behavior. Claim 35 defines a method of analyzing operation of a computer program comprising executing at least a portion of the computer program, determining a representative interval of execution, and simulating execution of computer program over the

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determined representative interval. These limitations define processes, which are a patentable category recited in § 101. Claims 1, 27, and 35 do not fall within any of the § 101 judicial exceptions, as they do not claim an abstract idea, a law of nature, or a natural phenomenon.

To the extent the Examiner asserts that Claims 1, 27, and 35 claim at least in part an abstract idea, Applicants submit that the claimed inventions satisfy § 101 at least because they produce a useful, concrete, and tangible result. As provided in the Interim Guidelines regarding usefulness (page 20), physical transformation "is not an invariable requirement, but merely one example of how a mathematical algorithm [or law of nature] may bring about a useful application." To be useful, utility merely has to be specific, substantial, and credible. In Claim 1, the result is at least a determined similarity between intervals of execution for code in a computer program. In Claim 27, the result is classified arbitrary sections of execution. In Claim 35, the result is simulated execution of a program over a representative interval. As stated in the present application, these results also may be used for, as non-limiting examples, code optimization and debugging. The claimed results are more than abstract concepts, and clearly meet the requirement of utility.

To be "tangible" does not necessarily mean that a claim must either be tied to a machine or apparatus or must operate to change articles or materials to a different state or thing. "Tangible" means that the claim recites more than a § 101 judicial exception, in that the process claim sets forth a practical application of that § 101 judicial exception to produce a real-world result. In other words, the opposite meaning of "tangible" is "abstract." See

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Interim Guidelines, page 21. Again, Claims 1, 27, and 35 respectively define, among other things, determining a similarity between intervals of execution for code in a computer program, classifying arbitrary sections of execution of a portion of a computer program according to identified behavior, and simulating execution of a computer program over a determined representative interval. These are clearly practical applications of processes, and are more than merely an abstract idea, e.g., a mathematical algorithm. Further, to be "concrete", the process must have a result that can be substantially repeatable. This has not been disputed. Thus, Claims 1, 27, and 35 meet the definition of a "useful, concrete, and tangible result."

Thus, the subject matter of Claims 1-43 is believed to be patentable under 35 U.S.C. § 101. See also, for example, claims 7, 13, and 24 of primary reference U.S. Patent No. 5,699,507 to Goodnow. Accordingly, Applicants submit that Claims 1-43 are patentable under § 101, and request reconsideration and withdrawal of the rejection.

Claims 1-17, 22-33, 35-40, 42-48, 50, and 52 stand rejected under 35 U.S.C. § 102(b) as being unpatentable over Goodnow. Applicants respectfully traverse the rejection.

Regarding independent claim 1, Goodnow neither teaches nor suggests at least running code of a computer program over an plurality of intervals of execution, identifying a behavior of the computer program over each of the plurality of intervals of execution, and comparing at least one identified behavior for at least one interval of execution to another interval of execution to determine similarity between the intervals of execution. As explained in the present specification (e.g., page 11, line 6), an interval is a selection of

continuous instructions in program execution order, which may include, for example, a time interval, an instruction interval, and/or a metric-based interval.

In Goodnow, by contrast, a plurality of code segments are analyzed, in which each code segment is comprised of one or more specific lines of program instructions (Abstract; claims 1, 2, 13, 24). These code segments are compared to one another, using static or dynamic attributes (e.g., see col. 8, lines 61-65; col. 4, lines 39-65; Tables 6-11). The functions cited in the Office Action (e.g., col. 10, lines 11-25) are part of a dynamic analysis for identifying similarities between code segments by determining the probability that a given function will transition to another given function.

The claimed interval is different from the code segment in Goodnow at least because an interval can include several code segments, repeat code segments, etc. This is a significant difference. For example, some embodiments of the present invention can consider particular code segments that execute within a particular interval as a program component (referred to in some embodiments of the present invention as basic blocks), and track their frequency within the interval, which apparently is not taught by Goodnow.

Similarly, as to claim 27, Goodnow fails to teach or suggest at least identifying behavior of a hardware-independent metric within at least one arbitrary section of execution of a portion of a computer program, or classifying each of the at least one arbitrary section of execution according to the identified behavior into clusters of similar behavior. Goodnow identifies behavior of code segments, not behavior of arbitrary sections of program execution. This difference is further clarified in dependent claim 28, for example, which

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defines identifying a frequency of execution of basic blocks of the executed code. The Office Action cites col. 8, lines 55-56 for teaching the additional features of claim 28, but this cited portion refers to occurrences of an attribute within a block (a single entry such as a line instruction – col. 9, lines 13-15), not frequency of basic blocks of executed code within an arbitrary section of program execution.

Additionally, as to claim 35, Goodnow fails to teach or suggest at least identifying behavior of a hardware-independent metric for each of a plurality of intervals of execution, comparing the identified behavior of each of the plurality of intervals to the identified target behavior over full execution to determine a representative interval, or simulating execution of the computer program over the determined representative interval. Again, Goodnow compares code segments, not intervals of execution. Moreover, the Office Action cites col. 8, lines 62-67 for teaching simulating execution of the computer program over a determined representative interval, but this section merely teaches running the program and extracting dynamic attributes. In Goodnow, this is done to additionally compare code segments. Further, the Office Action does not appear to cite a portion in Goodnow for teaching determining a representative interval (see Office Action, page 17).

For at least these reasons, Applicants respectfully submit that claims 1, 27, and 35, and dependent claims 2-17, 22-26, 28-33, 36-40, 42-48, 50, and 52 are allowable over the references of record, including Goodnow. Applicants thus request reconsideration and withdrawal of the rejection.

Claim 34 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Goodnow in view of Clark. Claims 18-21, 41, 49, 51, and 53 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Goodnow in view of Clark, and in further view of Baker. Applicants respectfully traverse these rejections for at least the reasons stated above regarding independent claims 1, 27, and 35, and for at least the additional reason that neither Clark nor Baker appears to remedy the deficiencies of Goodnow. For example, as recognized by the Examiner (page 22), Clark represents similarities between code segments, not intervals of execution (e.g., see Abstract and col. 1, lines 8-44 of Clark).

For at least the foregoing reasons, Applicants believe that this case is in condition for allowance, which is respectfully requested. The Examiner should call Applicants' attorney if an interview would expedite prosecution.

Respectfully submitted,

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